

A RARE LYTOCERATID AMMONITE FROM THE LOWER LIAS OF RADSTOCK

by D. T. DONOVAN and M. K. HOWARTH

ABSTRACT. A single lytoceratid ammonite from the Jamesoni or Ibex Zone of the Lower Lias of Clandown Colliery Quarry, Radstock, Avon, is made the holotype of *Derolytoceras* (*D.*) *radstockense* sp. nov. It is the first record in Britain of a genus that is largely restricted to Tethyan areas of south and central Europe.

THE partial or complete restriction of certain groups of ammonites to the Tethys has long been known, and was documented in some detail by Donovan (1967) for the Lower Jurassic. At this time, the Suborders Phylloceratina and Lytoceratina are so restricted except for certain limited spans of time when certain genera are found in northern Europe. Thus, Phylloceratina are represented in Britain by *Tragophylloceras* in the Pliensbachian and *Phylloceras* in the Upper Pliensbachian and the Toarcian, and Lytoceratina by *Lytoceras* in the Upper Pliensbachian and the Toarcian and by genera of the Alocolytoceratinae in the Upper Toarcian. A second class of occurrence comprises rare finds, usually made from a single horizon. The following fall into this category:

? a member of Juraphyllitidae from the Planorbis Zone of the Stowell Park Borehole, Gloucestershire (Spath 1956, p. 158). One of us (DTD) has re-examined this specimen, which was preserved in soft mudstone, but it is now in such an abraded state that further comment is not possible.

Galaticeras jacksoni Howarth and Donovan, a member of Juraphyllitidae, known from nine examples from the Flatstones (Obtusum Subzone) of the Dorset coast; *Galaticeras* sp. has been recorded from two boreholes in southern England (Howarth and Donovan 1964).

Meneghiniceras lariense (Meneghini), another juraphyllitid, a single specimen from the Grey Shales (Semicelatum Subzone) in the Toarcian near Whitby, Yorkshire (Howarth 1976).

Aegolytoceras rotundicosta (Tutcher and Trueman) from the Jamesoni Limestone of Radstock, discussed in detail below.

The present paper records an example of a lytoceratid genus new to Britain, from the Lower Lias of Radstock, collected sixty years ago but only recently recognized for what it is.

SYSTEMATIC PALAEOLOGY

Superfamily LYTOCERATAEAE Neumayr 1875

Family DEROLYTOCERATIDAE Spath 1927

Genus DEROLYTOCERAS Rosenberg 1909

Type species. *Ammonites lineatus tortus* Quenstedt 1885, subsequently designated by Spath 1924 (p. 4).

Subgenus DEROLYTOCERAS

Derolytoceras (*Derolytoceras*) *radstockense* sp. nov.

Text-fig. 1

Diagnosis. *Derolytoceras* attaining at least 80 mm diameter, with evolute, slowly expanding whorls, and an evenly rounded elliptical whorl section. Regular radial ribs are strong from 13 mm diameter,



TEXT-FIG. 1. *Derolytoceras (D.) radstockense* sp. nov. Holotype. Jamesoni Limestone, Lower Pliensbachian, Jamesoni or Ibex Zones, Clandown Colliery Quarry, Radstock, Avon. Bristol University Geology Museum no. 2877, $\times 0.95$.

and curve forwards to the middle of the venter. Three or four constrictions per whorl are similar in shape to the ribs, and are accentuated by an enlarged rib immediately in front. The suture-line is *Lytoceratid* with highly indented and undercut saddles.

Material. The holotype only, Bristol University Geology Museum no. 2877, from the Jamesoni Limestone, Lower Lias (Lower Pliensbachian: Jamesoni or Ibex Zone) at Clandown Colliery Quarry (ST 679 558), near Radstock, Avon. For the section at this quarry see Tutchter and Trueman 1925, p. 600. Collected in 1922 or 1923 by Mr. T. R. Fry.

Measurements. Maximum diameter 80.5 mm. At 78.1 mm diameter, whorl height = 23.8 mm (0.30), whorl breadth = 18.1 mm (0.23), umbilical width = 38.0 mm (0.49). There are thirty-three ribs and four constrictions on the outer whorl ending at 80 mm diameter.

Description. The specimen consists of about four visible whorls ending at a diameter of 80 mm. The mouth border is not present, for at least the final one-eighth of a whorl is missing. Suture-lines can be clearly seen just over half a whorl behind the aperture at a diameter of 57 mm. From the rough state of preservation it is not possible to see whether there are more suture-lines at a larger size, but the phragmocone may have extended about one-eighth of a whorl further forwards. This makes the length of the body chamber that is preserved between three-eighths and half a whorl in length. The whorls are evolute but not completely so, for each whorl overlaps about 20% of the next inner whorl. The whorl section is compressed elliptical and has an evenly rounded venter and umbilical wall. Capricorn ribs are well developed on all visible whorls from the smallest size seen, about 13 mm diameter, up to the aperture, though they diminish in strength on the last half whorl. They are approximately radial on the side of the whorl, then curve forwards towards the middle of the venter. There are four well-marked constrictions on the outer whorl that follow the line of the ribs exactly. They are made more prominent by an enlarged rib immediately in front of each one. Three constrictions can be seen on the next inner whorl, but at smaller sizes the preservation is not good enough for constrictions to be visible.

The suture-line (text-fig. 2) is typically *Lytoceratid*. The large first and second lateral saddles are deeply indented and undercut, and have complicated moss-like endings. The large first lateral lobe is divided into three prongs.

Remarks. Ammonites of the superfamily *Lytocerataceae*, other than *Lytoceras* itself, are almost unknown in the Sinemurian and Pliensbachian in Britain. The only one known previously is the

TEXT-FIG. 2. Suture-line at whorl height of 15 mm.
Approx. $\times 5$.



single specimen from the Jamesoni Limestone at Radstock that was the holotype and sole basis of the name '*Peripleuroceras*' *rotundicosta* Tutchter and Trueman (1925, p. 646, pl. 41, fig. 1) (BM(NH) C.41760). That specimen is smooth up to about 30 mm diameter, and then develops capricorn ribs mainly on the venter, that have become fairly strong by its maximum size of 49 mm diameter. It is wholly septate. It belongs to the Derolyoceratidae genus *Aegolytoceras* Späth 1924, of which *Peripleuroceras* Tutchter and Trueman 1925 is a junior synonym. Other species of *Aegolytoceras* develop the characteristic coarse capricorn ribs immediately behind constrictions, reverting to fine ribbing in front of constrictions. *Derolytoceras* (*D.*) *radstockensis* differs in having regularly strong capricorn ribs that develop at an earlier growth stage, and the only irregularity on the phragmocone is the single slightly stronger rib that follows in front of each constriction. It is difficult to tell whether the decrease in rib strength on the last half whorl is due to poor preservation or is the onset of adult ornamentation. These are features of the genus *Derolytoceras*, of which, at 80 mm diameter, it is one of the largest known examples. The subgenus *D.* (*Derolytoceras*) has ribs from an early growth stage, certainly by 13 mm diameter which is the smallest size visible in this Radstock specimen, while the subgenus *D.* (*Tragolytoceras*) remains smooth up to about 25 mm diameter. So the Radstock specimen belongs to the nominal subgenus. The type species is *D.* (*D.*) *tortum* (Quenstedt), of which the lectotype (Quenstedt, 1885, p. 309, pl. 39, fig. 15), refigured by Wiedmann (1970, p. 995, text-fig. 8e, pl. 6, fig. 3), is from the Upper Pliensbachian of south-west Germany. It has quickly expanding whorls and very strong ribs commence at about 11 mm diameter. Another Sinemurian or Pliensbachian species is *D.* (*D.*) *haueri* Rosenberg (1909, p. 251, pl. 11, figs. 31, 32), which is based on specimens of up to 15 mm diameter that have slowly expanding and finely ribbed evolute whorls. Though it is difficult to compare the much larger Radstock specimen with either of these species, it appears to differ from both of them in its slowly expanding whorls and coarse ribs.

At first sight the Radstock specimen seems to have considerable resemblances to the Polymorphitid genus *Platypleuroceras*, and many examples of *P. brevispina* (J. de C. Sowerby) or closely allied species have been found in the Jamesoni Limestone at Radstock (e.g. Tutchter and Trueman 1925, p. 650, pl. 39, fig. 3; pl. 40, fig. 2). The *Derolytoceras* differs, however, in lacking the ventro-lateral tubercle that occurs in all the specimens of *Platypleuroceras*, and in having more strongly projected ribs on the venter. It also has constrictions that are only rarely present in Radstock *Platypleuroceras* (though constrictions are better developed in similar Polymorphitidae from Germany, e.g. Quenstedt 1885, pl. 32, fig. 6; pl. 33, figs. 11, 12). Finally, the suture-line of the *Derolytoceratid* is distinctively Lytoceratid, and suture-lines in *Platypleuroceras* do not have such deeply indented or undercut saddles.

The family and generic classification used here is that of the *Treatise* (Arkell, 1957, p. L194). Two more recently proposed generic names are *Adnethiceras* Wiedmann (1970, p. 997) for species that have ventro-lateral tubercles, and *Lytoconites* Wiedmann (1970, p. 1004) which is considered here to be a synonym of *Aegolytoceras*. *Peripleuroceras* Tutchter and Trueman 1925, is also a synonym of the latter genus. Wiedmann (1970, p. 988) did not admit a separate family Derolytoceratidae, but placed it and its included genera in the Lytoceratidae. The distinctive

capricorn ornament of Derolytoceratidae seems to us, however, to be sufficiently different from the ornament of normal Lytoceratidae to warrant separation of this Sinemurian to Toarcian group as a family. Most genera of Derolytoceratidae were also discussed by Fantini Sestini (1973) who reinterpreted the genus *Audaxlytocras* Fucini 1923 (type species *Ammonites audax* Meneghini 1881 (non Oppel, 1863)) on the basis of specimens that were larger than the very small originals, and concluded that it was the oldest name for the group of species that have usually been referred to *Aegolytocras* Spath 1924.

The best collection of Derolytoceratidae, which was not discussed by either Wiedmann (1970) or Fantini Sestini (1973), comes from the Pliensbachian at Monte di Cetona, central Italy. Nine species of '*Derocras*' were described by Fucini (1903, pp. 166–185): all of them have Lytoceratid suture-lines, and amongst them are the largest known Derolytoceratidae, some specimens attaining 165 mm diameter. Several develop ventro-lateral tubercles and belong to *Adnethiceras* (e.g. *A. olenoptychum* Fucini, *A. mutans* Fucini and *A. instabile* Fucini), and about eight examples were figured of *Aegolytocras pecchiolii* (Meneghini), which is the most highly developed species of its genus. Nothing in the collection is exactly like the Radstock specimen, though the rather poorly preserved examples of *Derolytocras connexum* Fucini (1903, p. 176, pl. 26, figs. 7, 8) are the nearest, differing mainly in lacking clear constrictions.

REFERENCES

- ARKELL, W. J. 1957. In R. C. MOORE, *Treatise on invertebrate paleontology*. Part L, *Mollusca 4, Cephalopoda, Ammonoidea*. Geol. Soc. Amer.
- DONOVAN, D. T. 1967. The geographical distribution of Lower Jurassic ammonites in Europe and adjacent areas. *Publs Syst. Ass.* **7**, 111–134.
- FANTINI SESTINI, N. 1973. Revisione del genere *Audaxlytocras* Fucini, 1923 (Ammonoidea). *Riv. ital. Paleont. Stratigr.* **79**, 479–502, pl. 49.
- FUCINI, A. 1903. Cefalopodi liassici del Monte di Cetona. Part 3. *Palaontogr. ital.* **9**, 125–185, pls. 19–27.
- HOWARTH, M. K. 1976. An occurrence of the Tethyan ammonite *Meneghiniceras* in the Upper Lias of the Yorkshire coast. *Palaontology*, **19**, 773–777.
- and DONOVAN, D. T. 1964. Ammonites of the Liassic family Juraphyllitidae in Britain. *Ibid.*, **7**, 286–305, pls. 48, 49.
- QUENSTEDT, F. A. 1885. *Die Ammoniten des Schwäbischen Jura*. 1, *der Schwarze Jura (Lias)*, 241–440, pls. 31–54. Tübingen.
- ROSENBERG, P. 1909. Die Liassische Cephalopodenfauna der Kratzalpe im Hagengebirge. *Beitr. Paläont. Geol. Ost.-Ung.* **22**, 193–345, pls. 10–16.
- SPATH, L. F. 1924. On the Blake Collection of Ammonites from Kachh, India. *Mem. geol. Surv. India Palaont. indica*, **9**, mem. 1, 29 pp.
- 1956. The Liassic ammonite faunas of the Stowell Park Borehole. *Bull. geol. Surv. Gt. Br.* **11**, 140–164, pls. 9, 10.
- TUTCHER, J. W. and TRUEMAN, A. E. 1925. The Liassic rocks of the Radstock district, Somerset. *Q. Jl. geol. Soc. Lond.* **81**, 595–666, pls. 38–41.
- WIEDMANN, J. 1970. Über den Ursprung der Neoammonoideen—Das Problem einer Typogenese. *Eclog. geol. Helv.* **63**, 923–1020, pls. 1–10.

D. T. DONOVAN

Department of Geology
University College
Gower Street
London WC1E 6BT

M. K. HOWARTH

Department of Palaeontology
British Museum (Natural History)
Cromwell Road
London SW7 5BD